

**Information technology in a global society**  
**Case study: Asociación de Supermercados Independientes**  
**An investigation into Big Data**

For use in May and November 2015

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**Instructions to candidates**

- Case study booklet required for higher level paper 3 information technology in a global society examinations.

## Foreword

The ITGS case study, *Asociación de Supermercados Independientes: An investigation into Big Data*, is the stimulus material for the research investigation required for May and November 2015 higher level paper 3. All of the work related to the case study should reflect the integrated approach explained on pages 15–17 of the ITGS guide.

Candidates should consider *Asociación de Supermercados Independientes: An investigation into Big Data* with respect to:

- relevant IT systems in a social context
- both local and global areas of impact
- social and ethical impacts on individuals and societies
- current challenges and solutions
- future developments.

Candidates are expected to research real-life situations similar to *Asociación de Supermercados Independientes: An investigation into Big Data* and relate their findings to first-hand experiences wherever possible. Information may be collected through a range of activities: secondary and primary research, field trips, guest speakers, personal interviews and email correspondence.

Responses to examination questions **must** reflect the synthesis of knowledge and experiences that the candidates have gained from their investigations. In some instances, additional information may be provided in examination questions to allow candidates to generate new ideas.

Big Data is a commonly used term with no single accepted definition. Most definitions are linked to the analysis of very large data sets, which do not use the traditional relational database model, by organizations to provide a competitive advantage.

## Overview

5 In Mexico, over 300 independent family-owned supermarkets across the country have recently decided to create an association of local supermarkets called the *Asociación de Supermercados Independientes* (ASI). This was proposed so they could use economies of scale when purchasing goods to compete with the larger more established supermarket chains, who currently receive better prices from suppliers. Currently each family-owned supermarket is responsible for the purchasing of stock for their own store. The ASI management has chosen to  
10 have its Head Office in Mexico City.

Since they are local community stores many supermarkets in the ASI have become involved with community organizations such as schools and sports clubs. Based on customers' suggestions, the supermarkets often donate a small percentage of their sales revenue to these community organizations. They believe it is important to be an integral and socially responsible  
15 part of the community they serve.

The managers of the supermarkets do not feel they have a systematic way of analysing data from customer purchases, which may be reducing possible profits and their competitiveness with large supermarket chain stores in the area.

## Current IT system

- 20 Currently, each store operates its own independent information system that manages the sales, finance and stock data on a local area network. Various types of EPOS (Electronic Point of Sale) and stock control systems are used by the different stores in these information systems. To order stock from the suppliers a variety of methods are used, such as email, online ordering, phone calls and faxes.

## The changing situation

### The ASI Loyalty Card scheme

- 25 The management of the ASI realized that customers like to feel that they are being rewarded either altruistically, by giving to good causes, or financially, through price discounts. The introduction of a loyalty card scheme was seen as a mechanism to facilitate the rewarding of customers.
- 30 About five years ago the large supermarket chains developed loyalty card schemes that offer points based on the value of the goods purchased, which are recorded at the checkout. The ASI Loyalty Card will reward customers with 1 point for each 10 peso purchase. The points can be redeemed for a variety of goods and services such as discounts, gifts, travel vouchers and donations to a charity, where 5 points is equivalent to 1 peso.
- 35 Customers can register at any ASI supermarket by filling in a written form with personal details, and are given a card soon after with the customer name and Loyalty ID number (also recorded as a barcode so it can be scanned quickly). This data in the customer database will eventually lead to an online profile being created which will also contain details of purchases along with other information such as time of purchase and store location. Customers will be able to access their profile and purchasing record on the ASI website.
- 40 Whenever a customer in a supermarket taking part in the ASI Loyalty Card scheme makes a purchase, their loyalty card barcode is scanned like a normal product barcode. After payment they receive a receipt. In some cases the receipts may not show the full name of the item, only the amount paid for it. However, the loyalty card ID number, the product code (the name is not needed) of the item, plus additional data, such as the price, store ID number, and time and
- 45 date of purchase, are put into the store database without the customer being aware of it. This data is eventually transferred to the ASI data warehouse and is included in the profile of the customer.

# SHOPCO

PHONE: 078675309  
STORE: 0545  
RECEIPT: 8096  
SERVED BY: MARIA-316

	<b>P</b>
BANANAS	9.15
TEABAGS	30.99
TEABAGS	30.99
BEANS (LOOSE)	45.50
BAKED BEANS	10.35
BAKED BEANS	10.35
ORANGES	7.55
 SUB TOTAL	 144.88

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TOTAL TO PAY	144.88
CREDIT CARD SALE	144.88
NUMBER :	*****9999
AUTH CODE :	085463
MERCHANT :	84387283
EXPIRY :	09/17
Cardholder Signature Verified	
CHANGE DUE	0.00

**ASI LOYALTY CARD**  
You have earned 14  
ASI Loyalty Card points in  
this transaction for Loyalty Card  
2793276164719  
Total points balance: 987  
Visit [asi.mx/LoyaltyCard/](http://asi.mx/LoyaltyCard/)  
to redeem your reward

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**ASI LOYALTY CARD**

[asi.mx/LoyaltyCard/](http://asi.mx/LoyaltyCard/)

**ASI LOYALTY CARD**

[asi.mx/LoyaltyCard/](http://asi.mx/LoyaltyCard/)

Diego Ortega



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## Proposed system

Manuel Arriagada, a member of the senior management team of ASI, realized that in aggregating data from many stores there was an opportunity to find out more about customers and their purchasing patterns. Manuel, while working in the United States, had heard of how businesses had been improved by implementing “Big Data” analysis techniques on the data that their business was collecting from the stores and customers.

ASI will use SUSA Analytics, a company that Manuel has worked with previously, to provide advice and expertise to support local stores with the analysis of the data. He will liaise with Lorena Florentes from SUSA Analytics throughout the process.

ASI will gather large amounts of data about customer behaviour and product purchases through the use of a loyalty card scheme. This can be used for deeper analysis of their business activities. ASI will use the data collected for targeted advertising, marketing to customers who show various behavioural traits and to identify valuable customers.

## 60 Stock management

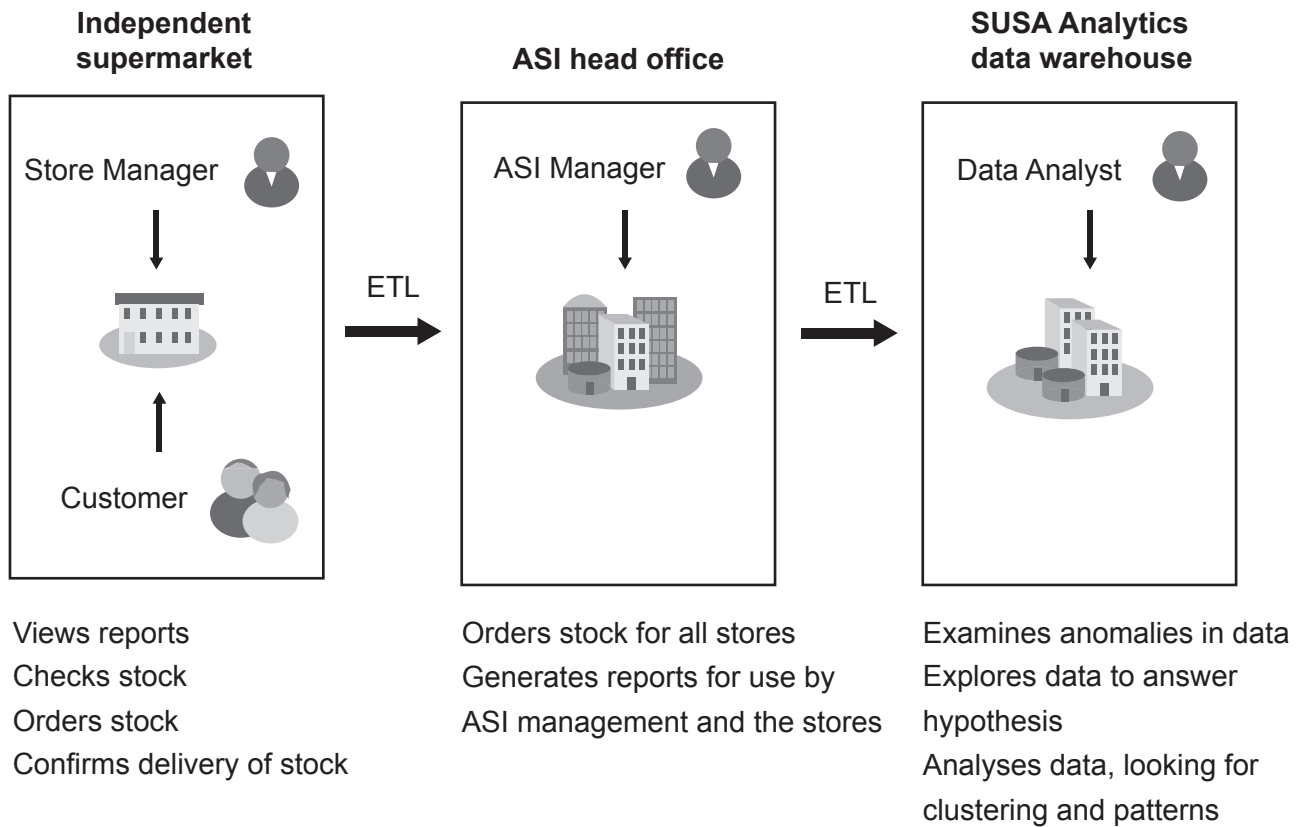
Decisions on what to stock, and when, are based on current sales patterns and the stock control database. As a result of discussions at their monthly meetings the managers of the individual stores have concluded that the current systems are inadequate for the following reasons:

- there has been an increase in customer complaints that certain goods are not available
- 65 • managers have noticed that the shelves are either empty or overstocked, and in this case has to sell the goods at a reduced price.

The store managers have recognized that this lack of efficiency in stock management is reducing their ability to make profits and compete with the large supermarket chains.

As a result, the management of the ASI, after further discussions with store managers, is in the process of setting up stock distribution centres in the various regions. The operations of the centres will rely on the information provided by SUSA Analytics and ASI Head Office in Mexico City. This means that stock can be bought in bulk from local and international suppliers at a competitive price to that of the larger supermarket chains. Each distribution centre will use a Just-in-Time (JIT) process to ensure that the volume of stock being held in storage both in the distribution centre and in the individual supermarkets is as low as possible.

### The proposed integrated ASI information system – stock and customer data



The data from the individual supermarkets may be in a variety of formats.

This data is assimilated into a relational database at the ASI head office.

The data in the SUSA Analytics data warehouse is in a different format to that sent from the head office.

Extract, Transform, Load (ETL) is taking place in the ASI head office and again at the SUSA Analytics data warehouse.

## Challenges faced

### Analysing Big Data

- SUSANAalytics will provide reports based on the data provided by customers in ASI stores. This will allow ASI to create comprehensive customer profiles and to introduce targeted marketing.
- 80 • Strategic data analysis using data mining techniques will be used to discover patterns to inform future decisions and planning. This will include: clustering/pattern analysis, forecasting, hypothesis testing and targeted marketing. The data collected will be used for analysing current customer purchasing patterns and predicting future customer purchasing patterns to allow the supermarkets to create medium- and long-term forecasts for staffing
- 85 requirements and marketing strategies.
- Operational reporting and analysis includes exception reporting, querying of the store database to produce regular and customized reports, real-time display of sales and inventory, and data visualization of sales and trends. Data is collected to assist managers in making short-term decisions about appropriate stock levels, numbers of staff for a particular time/day,
- 90 number of checkout lanes required and opening times.
- Data analysts have expressed concerns about the homogeneity of such large data sets and the ability of data analysis techniques to determine information that is specific to individual stores. For example, the findings from the analysis of the Big Data may provide suggested pricing levels for products for all of the stores in the ASI, but pricing of individual products
- 95 may need to vary from store to store.
- The opening hours of the store and the shift details of staff, as well as their wages, will also be collected and included in the analyses. Recommendations can be made to store managers about managing the store and the staff.

### Communicating the data analytics approach

- 100 • Manuel is concerned that with such a large amount of technical language, he will not be able to explain the way the proposed system would function. Lorena Florentes from SUSANAalytics has been asked to outline how the system would work to senior managers of ASI and to individual store managers (see diagram on page 7). Lorena's ability to explain the technical language in a form that is understandable by the audience is a major advantage.
- 105 • As well as the technical details Lorena will demonstrate and explain the benefits of the analytical techniques identified above, which the individual store managers and ASI managers in the Head Office will be trained to use.



**Ethical and social impacts**

- 110 • With respect to customers involved in the loyalty card scheme, ASI is unsure to what extent customers should be aware of how much information is being collected about them, the purpose for which it will be used, and with whom it will be shared.
- ASI is concerned that customer involvement in the loyalty card system may have implications for their privacy, security and anonymity.
- ASI must develop policies for the ethical use of customer and corporate data.
- 115 • ASI is keen to ensure customer details held in the database can be anonymized when used.
- The implications of using the data collected about customer behaviour for targeted advertising to and preferential treatment for individual customers need to be investigated.

**Implementation issues**

- 120 • ASI management are concerned and stress that according to data privacy laws there must be appropriate access controls to protect customer and store data when accessed from the database system. This is because the data will be accessible in real-time via a web-browser/smartphone dashboard app by managers; and by customers through the loyalty card scheme website and smartphones.
- 125 • Manuel, in consultation with Lorena, will develop a detailed timeline for implementation of the new system.

**Specific information technology items, additional to those in the ITGS guide, which are associated with *Asociación de Supermercados Independientes: An investigation into Big Data***

**Analysis**

Business intelligence software  
Clustering/pattern analysis  
Data analysis/data analytics  
Data extrapolation  
Data mining  
Data querying  
Data visualization  
Data warehouse  
ETL (Extract, Transform, Load) process  
Forecasting and hypothesis testing

**Marketing**

Behavioural marketing  
Targeted advertising  
Targeted marketing

Any individuals named in this case study are fictitious and any similarities with actual entities are purely coincidental.

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